

1. A tire management system, comprising:
 - a primary control unit positioned onboard a vehicle, said vehicle having at least one tire;
 - a central secondary control unit spaced apart from said vehicle and in wireless
5 communication with said primary control unit;
 - a central tire inflation (CTI) system positioned onboard said vehicle and operationally controlled by said primary control unit; and
 - at least one pressure gauge disposed onboard said vehicle and adapted and
constructed to measure tire pressure and transmit tire pressure information to
10 said primary control unit.
2. The tire management system of claim 1, wherein said at least one pressure gauge is disposed in the CTI system.
- 15 3. The tire management system of claim 1, wherein said at least one pressure gauge is disposed at a tire.
4. The tire management system of claim 1, wherein the CTI system is in fluidic communication with an onboard pressurized air source for supplying pressurized air
20 to the tires.
5. The tire management system of claim 1, wherein the CTI system is connected to at least one tire to control the inflation and deflation of the tire by supplying pressurized air.
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6. The tire management system of claim 1, wherein the CTI system is connected to at least one tire to control the inflation and deflation of the tire by exhausting pressurized air.
- 30 7. The tire management system of claim 1, wherein at least one of the primary control unit and the central secondary control unit is adapted and constructed to monitor tire

pressure using tire pressure information provided by the at least one pressure gauge.

8. The tire management system of claim 1, further comprising a communication device that provides said wireless communication.

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9. The tire management system of claim 8, wherein said central secondary control unit is adapted and constructed to provide a target tire pressure, an operational objective, or both, for the primary control unit.

- 10 10. The tire management system of claim 1, further comprising at least one condition sensing component positioned onboard said vehicle, wherein said condition sensing component is adapted and constructed to transmit sensed information to said primary control unit.

- 15 11. The tire management system of claim 10, wherein said at least one condition sensing device is selected from the group consisting of: a vehicle load weight sensing device; tire tread depth sensor; tire tread separation sensor; wheel balance sensor; wheel alignment sensor; axle alignment sensor; tire slippage sensor; braking sensor; data link to an onboard ABS; road condition vibration sensor; a vehicle speed sensing device; an ambient temperature sensor; a tire temperature sensor; a barometer; a GPS device; a fuel consumption meter; and any combination thereof.
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12. The tire management system of claim 1, further comprising:
a display and input panel positioned onboard said vehicle and adapted and
constructed to allow input and output access by a vehicle occupant, wherein
said panel is adapted and constructed to receive information signals from said
primary control unit and input from said vehicle occupant.
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13. The tire management system of claim 12, wherein said primary control unit is adapted and constructed to receive data from said at least one tire pressure gauge and display said data to said vehicle occupant on said display and input panel.
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14. The tire management system of claim 10, further comprising:
a display and input panel positioned onboard said vehicle and adapted and
constructed to allow input and output access by a vehicle occupant, wherein
said display and input panel is adapted and constructed to receive information
signals from said primary control unit and input from said vehicle occupant
wherein said primary control unit is adapted and constructed to receive data
from said at least one condition sensing component and said at least one tire
pressure gauge and display said data to said vehicle occupant on said display
and input panel.
15. The tire management system of claim 10, wherein said primary control unit is adapted
and constructed to use data from at least one of said at least one tire pressure gauge
and at least one condition sensing component to calculate a target tire pressure
according to a predetermined operational objective.
16. The tire management system of claim 1 or 10, wherein said primary control unit is
adapted and constructed to control the CTI system without real-time input from a
vehicle occupant or said central secondary control unit.
17. The tire management system of claim 1 or 10, wherein said central secondary control
unit is adapted and constructed to control the CTI system without real-time input
from a user local to said central secondary control unit or a vehicle occupant.
18. The tire management system of claim 1 or 10, wherein said primary control unit is
adapted and constructed to allow a vehicle occupant to exercise direct control over
the CTI system.
19. The tire management system of claim 1 or 10, wherein said central secondary control
unit is adapted and constructed to allow a user to exercise direct control over said CTI
system.

20. The tire management system of claim 1, wherein said central secondary control unit is in electronic communication with a display and input panel wherein said central secondary control unit is adapted and constructed to receive operational data from said primary control unit and provide said data to said display and input panel.
21. The tire management system of claim 10, wherein said central secondary control unit is in electronic communication with a display and input panel, and wherein said central secondary control unit is adapted and constructed to receive data from said at least one condition sensing component and said at least one tire pressure gauge and display said data to said display and input panel.
22. The tire management system of claim 20 or 21, wherein said display and input panel is adapted and constructed to receive an input selected from a target tire pressure and an operational objective from a user and transmit said input to said central secondary control unit.
23. The tire management system of claim 20 or 21, wherein said central secondary control panel is adapted and constructed to receive an operational objective from a user and transmits a target tire pressure corresponding to said operational objective or said operational objective to said central secondary control unit.
24. The tire management system of claim 20, wherein said central secondary control unit is adapted and constructed to process data from said at least one tire pressure gauge to calculate a target tire pressure according to a predetermined operational objective.
25. The tire management system of claim 20, wherein said primary control unit is adapted and constructed to process data from said at least one tire pressure gauge to calculate a target tire pressure according to a predetermined operational objective.
26. The tire management system of claim 24 or 25, wherein said operational objective

includes one or more of: increase in tire life; increase in traction; reduction in road damage; achievement of a tire pressure optimized for selected operational conditions; travel at a predetermined speed; travel on a particular surface; travel under a predetermined load weight; reduction in tire temperature; travel at a predetermined altitude; reduction of fuel consumption; and achievement of a predetermined contact area between a tire and a surface.

27. The tire management system of claim 1 or 10, further comprising:
a plurality of primary control units, each positioned onboard a vehicle having a CTI system, wherein said CTI system is operationally controlled by the primary control unit onboard its respective vehicle,
wherein each primary control unit is in wireless communication with said central secondary control unit.

28. The tire management system of claim 27, wherein each of said plurality of primary control units is adapted and constructed to maintain a target tire pressure in tires attached to the vehicle having the primary control unit, and wherein the target tire pressure is not the same for each primary control unit.

29. The tire management system of claim 27, wherein each of said plurality of primary control units is adapted and constructed to maintain a tire pressure in tires attached to the vehicle having the primary control unit according to a predetermined operational objective, and wherein the operational objective is not the same for each primary control unit.

30. The tire management system of claim 27, wherein said central secondary control unit is adapted and constructed to calculate a target tire pressure for each vehicle based on a predetermined operational objective, wherein the operational objective is not the same for each vehicle.

31. The tire management system of claim 30, wherein said central secondary control unit

is adapted and constructed to calculate said operational objective for each vehicle using data received from said vehicle.

5 32. The tire management system of claim 31, wherein said central secondary control unit is adapted and constructed to calculate said operational objective for each vehicle using data received from a different vehicle.

10 33. A method of tire management, comprising:
obtaining operational condition data using at least one condition sensing component positioned onboard a vehicle; and
transmitting said operational condition data to a central secondary control unit spaced apart from said vehicle.

15 34. The method of claim 33, further comprising:
displaying said operational condition data on a first display and input panel onboard said vehicle.

20 35. The method of claim 33, further comprising:
displaying said operational condition data on a second display and input panel in electronic communication with said central secondary control unit.

25 36. The method of claim 33, further comprising sending control signals to a CTI system disposed on said vehicle, wherein said CTI system maintains a target pressure in at least one tire of said vehicle according to said control signals.

30 37. The method of claim 33, further comprising transmitting said operational condition data to a primary control unit onboard said vehicle, wherein transmitting said operational data to a central secondary control unit comprises transmitting said operational data from said primary control unit to said central secondary control unit.

38. The method of claim 37, further comprising:

receiving an operational objective at said primary control unit from said central
secondary control unit, wherein said primary control unit sends control signals
to a CTI system disposed on said vehicle according to said operational
objective, and wherein said CTI system maintains a target tire pressure in at
least one tire of said vehicle according to said control signals.

39. The method of claim 33, further comprising receiving input from a user local to said
central secondary control unit and maintaining a target pressure in at least one tire of
said vehicle according to said input.

40. The method of claim 39, wherein said input comprises a target tire pressure, an
operational objective, or both.

41. The method of claim 37, further comprising:
receiving input to the primary control unit; and
maintaining a target pressure in at least one tire of said vehicle according to said
input.

42. The method of claim 33, further comprising:
communicating control signals to a CTI system disposed onboard said vehicle,
wherein said CTI system adjusts pressure in at least one tire of said vehicle
according to said control signals, wherein the control signals are based upon
predetermined operational objectives.

43. The method of claim 37, further comprising:
communicating control signals to a CTI system disposed onboard said vehicle,
wherein said CTI system adjusts pressure in at least one tire of said vehicle
according to said control signals, wherein said control signals are based upon
predetermined operational objectives.

44. The method of claim 33, further comprising:

recording at least a portion of said operational condition data in said central
secondary control unit.

45. The method of claim 33, further comprising:

5 reporting at least a portion of said operational condition data to a vehicle occupant, a
user local to said central secondary control unit, or both.

46. The method of claim 33, wherein the condition sensing component may sense one or
10 more of the following: tire pressure; vehicle load weight; tire tread depth; tire tread
separation; wheel balance; wheel alignment; axle alignment tire slippage; braking
strength; data link from an onboard ABS; road condition; axle vibration; vehicle
speed; ambient temperature; tire temperature; altitude; atmospheric pressure;
geographic location; fuel consumption level; and fuel consumption rate.

15 47. A method of tire management, comprising:

receiving operational condition data from a vehicle at a location spaced apart from the
vehicle, wherein said operational condition data is collected from at least one
condition sensing component positioned onboard the vehicle.

20 48. The method of claim 47, wherein said operational condition data are received at a
central secondary control unit.

49. The method of claim 48, further comprising setting an operational objective for said
vehicle at said central secondary control unit, wherein said central secondary control
25 unit transmits said operational objective, a target tire pressure, or both to said vehicle.

50. The method of claim 49, wherein said operational objective comprises one or more
of: target tire pressure; increase in tire life; increase in traction; reduction in road
damage; achievement of a tire pressure optimized for a predetermined operational
30 condition; travel at a predetermined speed; travel on a predetermined surface; travel
under a predetermined load weight; reduction in tire temperature; travel at a particular

altitude; reduction of fuel consumption; and achievement of a predetermined contact area between a tire and a surface.

51. The method of claim 48, further comprising causing a service provider to visit said vehicle in response to said received operational condition data.
52. The method of claim 48, further comprising receiving operational condition data from a plurality of vehicles at a location spaced apart from at least a portion of said plurality of vehicles.
53. The tire management system of claim 52, wherein said central secondary control unit transmits a predetermined operational objective to at least a portion of said plurality of vehicles, wherein said operational objective is not the same for each of said plurality of vehicles.
54. The tire management system of claim 52, wherein said central secondary control unit calculates a target tire pressure for at least a portion of said plurality of vehicles based on a predetermined operational objective, wherein the operational objective is not the same for each of said plurality of vehicles.
55. The tire management system of claim 52, wherein said central secondary control unit calculates an operational objective for each vehicle using data received from at least a portion of said plurality of vehicles.